UNIVERSITY OF JOHANNESBURG

FACULTY OF SCIENCE

DEPARTMENT OF BIOTECHNOLOGY AND FOOD TECHNOLOGY

NATIONAL DIPLOMA: BIOTECHNOLOGY

MODULE BTN2AFT

FERMENTATION TECHNOLOGY 2

CAMPUS DFC

SUPPLEMENTARY JUNE EXAMINATION 2018

DATE: 10/06/18	**SESSION 16:30-18:30**
ASSESSOR(S)	**MR F.Y THIERRY**
EXTERNAL MODERATOR	**DR N. MEHLOMAKULU**
DURATION 120 MINUTES	**MARKS 115**
TOTAL PAGES:	**3 PAGES**

INSTRUCTIONS:

- ALL QUESTIONS ARE COMPULSORY.
- EACH CANDIDATE SHOULD HAVE ONE ANSWER SCRIPT
- CALCULATORS ARE ALLOWED IN THE EXAM HALL AND CELL PHONE SHOULD NOT FOR ANY REASON BE USED AS CALCULATOR.

Question 1

1.1 Define and list the different applications of the **primary** screening method used in fermentation techniques. (8)

1.2 Name and briefly describe the four classes of variables used in process control (4)

[12]

Question 2

2.1 There have been several reports that the productivity of a continuous fermentation is greater than that of a batch fermentation. However, only few batch fermentations have been successfully converted to a continuous fermentation process. Give ten reasons of your choice why it has been so.
(10)

2.2 Give the main purpose of a fermentation medium use in industries and name different components that can be added in a fermentation medium. (8)

2.3 It is assumed that during cellular multiplication, a microorganism does not change physiologically or generically. Describe with example the effect of mutation on microorganisms. (10)

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Question 3

3.1 Give four reasons why sterilization is very important in fermentation industries (4)

3.2 Name and describe the mechanisms of sterilization that can be employed in sterilizing media for industrial fermentations. (15)

3.3 Inoculum production is a **critical stage** in an industrial fermentation process and usually the amount introduced into a production tank is usually in the **0.5% to 5%** range. However, under certain conditions, more **than 20% inoculum** can be used. Give three conditions that require the use of high inoculum level. (3)

3.4 During the process of fermentation foaming may and in some cases may not occur. Give three problems that foaming can cause in fermentation and describe how it can controlled chemically. (10)

3.5 Name and briefly describe the different ways in which a continuous fermentation can be conducted. (6)

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Question 4

4.1 Microbial activity in continuous culture can be controlled using "turbidostat" and/or the "chemostat" approaches. Briefly describe each approach and give two advantages and two disadvantages for each approach. (8)

4.2 There are several requirements for a fermentor. Given your knowledge in fermentation, give ten requirements of a fermentor of your choice. (10)

4.3 List the seven steps of the **mechanism of Rotary Drum Vacuum Filter** used in product recovery (7)

4.4 Describe the fermentation and production recovery costs effect with reference to the **contamination and sterilization**. (12)

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